

Application Serial No: 10/509,463

Responsive to the Office Action mailed on: December 10, 2008

REMARKS

This Amendment is in response to the Office Action mailed on December 10, 2008. Claim 5 is amended and is supported, for example, in Figures 1 and 2. No new matter is added. Claims 5 and 7-9 are pending with claims 10 and 11 being withdrawn.

§103 Rejections:

Claims 5, 7 and 9 are rejected as being unpatentable over DeLozanne (US Patent No. 5,004,721) in view of Higuchi (US Patent No. 5,079,224) in view of Shioya (US Patent No. 5,017,550) and further in view of Suzuki (US Patent No. 4,622,919). This rejection is traversed.

Claim 5 is directed to an apparatus for manufacturing a thin film in which the thin film is formed on a supporting base that requires, among other features, an electron beam evaporation source, an electron beam source and a resistance heating evaporation source. The electron beam evaporation source, the electron beam source and the resistance heating evaporation source are arranged so that a path along which the electron beam emitted from the electron beam source reaches the electron beam evaporation source intersects with a line segment connecting the resistance heating evaporation source with the surface to be vapor-deposited. Also, the electron beam source and the electron beam evaporation source are arranged so as to be opposed to each other with respect to a straight line connecting the resistance heating evaporation source with the surface to be vapor-deposited. An advantage of these features is that a vapor steam of the second thin film material directed toward the surface to be vapor-deposited from the resistance heating evaporation source is allowed to intersect with an electron beam to be used to evaporate the first thin film material by heating. Thus, the electron beam is capable of evaporating the first thin film material by heating and can ionize and activate the evaporated second thin film material uniformly and efficiently.

The combination of DeLozanne, Higuchi, Shioya and Suzuki does not teach or suggest these features. The rejection relies on Higuchi for teaching that an electron beam evaporation source, an electron beam source and the resistance heating evaporation source are arranged so that a path along which the electron beam emitted from the electron beam source reaches the electron beam evaporation source intersects with a line

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segment connecting the resistance heating evaporation source with the surface to be vapor-deposited. Higuchi is directed to production method of superconductive thin film thermionic beam generators (41, 42 and 43) provided between closed type crucibles (11, 12 and 13) and a substrate (5) (see Figure 1 of Higuchi). Heating devices (31, 32 and 33) allow metal in the crucibles (11, 12 and 13) to be evaporated by heating. The thermionic beam generators (41, 42 and 43) radiate thermionic beams to the streams of metallic elements directed toward the substrate (5) from the crucibles (11, 12 and 13) so as to partially ionize the metallic streams (see column 3, lines 37-42 of Higuchi) and do not allow a solid metallic material to be evaporated by heating. Thus, the thermionic beam generators 41, 42 and 43 cannot be an electron beam source as required by claim 5, as the thermionic beam generators (41, 42 and 43) do not emit an electron beam to be used to evaporate a first thin film material by heating. Accordingly, Higuchi cannot teach or suggest that an electron beam evaporation source, an electron beam source and a resistance heating evaporation source are arranged so that a path along which the electron beam emitted from the electron beam source reaches the electron beam evaporation source intersects with a line segment connecting the resistance heating evaporation source with the surface to be vapor-deposited, as required by claim 5. Also, Higuchi cannot teach or suggest an electron beam source and an electron beam evaporation source arranged so as to be opposed to each other with respect to a straight line connecting a resistance heating evaporation source with a surface to be vapor-deposited.

Moreover, the advantages of using an electron beam source to evaporate the first thin film material by heating, and thereby ionizing and activating the evaporated second thin film material uniformly and efficiently cannot be achieved using the thermionic beam generators (41, 42 and 43) of Higuchi, as the thermionic beam generators (41, 42 and 43) are not capable of emitting an electron beam that can evaporate a first thin film. DeLozanne, Shioya and Suzuki do not overcome these deficiencies of Higuchi. For at least these reasons claim 5 is not suggested by the combination of DeLozanne, Higuchi, Shioya and Suzuki and should be allowed. Claims 7 and 9 depend from claim 5 and should be allowed for at least the same reasons.

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Claim 8 is rejected as being unpatentable over DeLozanne, Higuchi, Shioya and Suzuki. This rejection is traversed. Claim 8 depends from claim 5 and should be allowed for at least the same reasons described above. Applicants do not concede the correctness of this rejection.

Conclusion:

Applicants respectfully assert that claims 5 and 7-9 are in condition for allowance. If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Douglas P. Mueller (Reg. No. 30,300), at (612) 455-3804.



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Respectfully submitted,

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